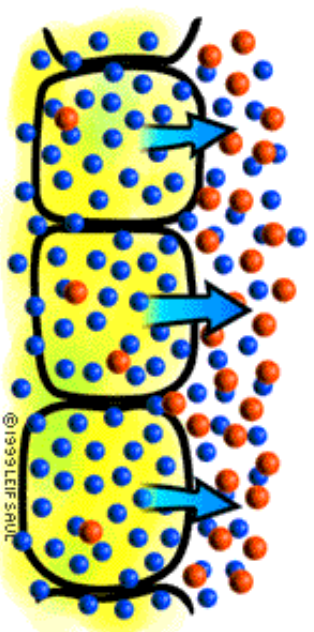


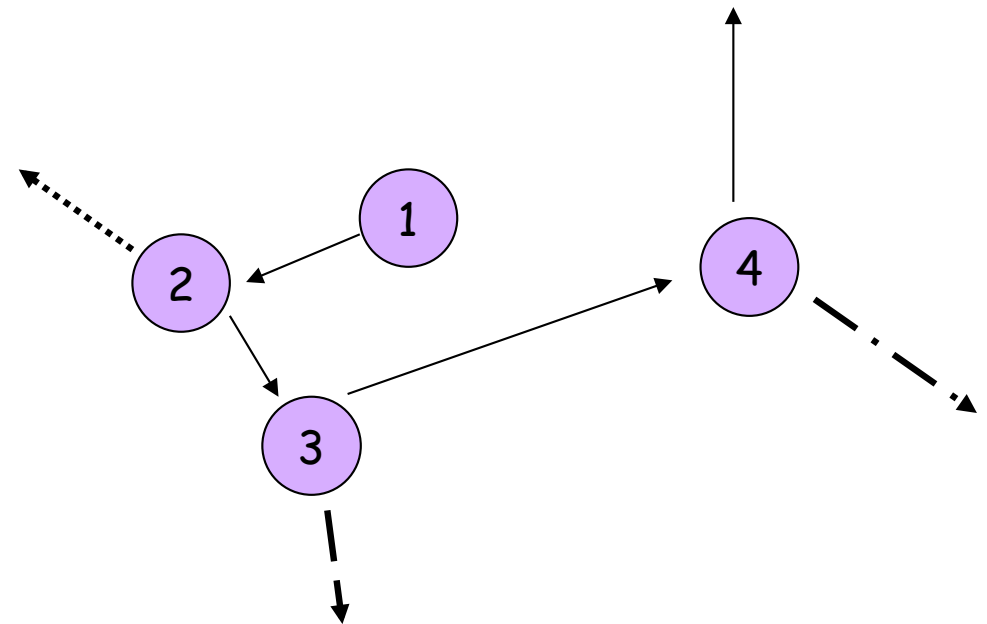
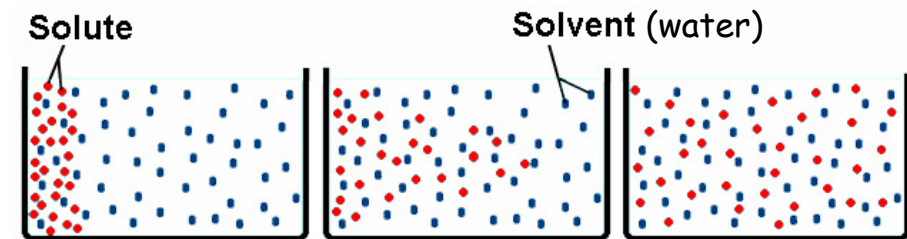
Diffusion and Osmosis



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Diffusion

- Solute molecules moving from an area of high concentration to an area of low concentration
 - Random motion drives diffusion
 - Movement is based on kinetic energy (speed), charge, and mass of molecules
 - Equilibrium is reached when there is an even distribution of solute molecules



Osmosis



Diffusion of water through a semi-permeable membrane

- Semi-permeable: permeable to solvents (WATER), but not to large molecules
- High [water] to low [water]



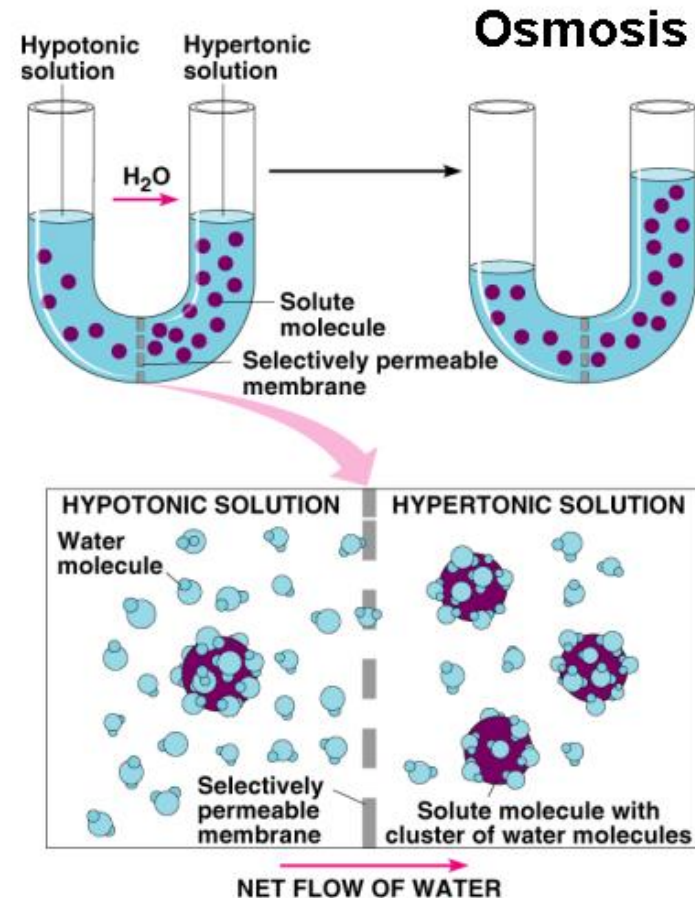
Dissolved molecules (i.e. glucose, starch) are called solutes



REMEMBER:

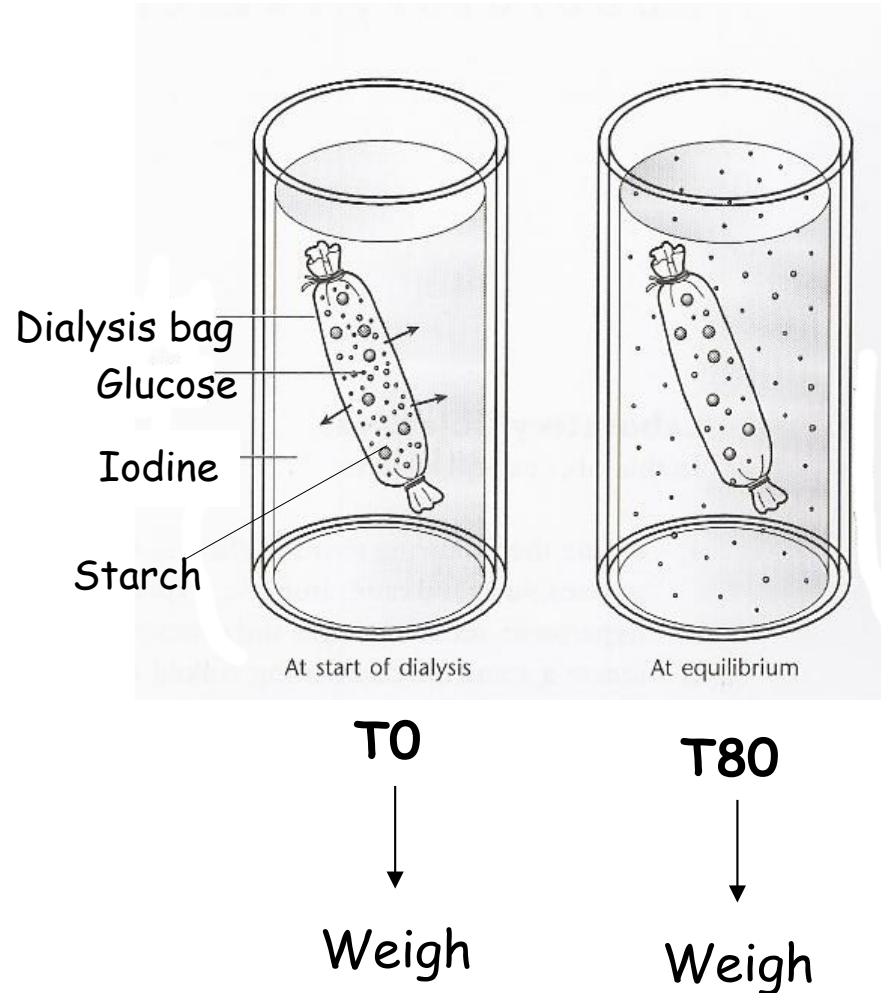
Water = solvent

Glucose, Starch = solutes



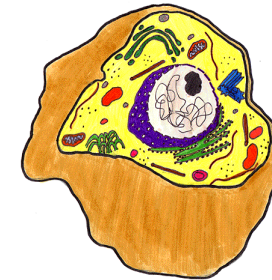
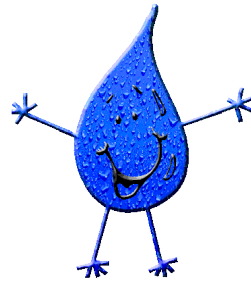
Dialysis Bag Experiment

- Dialysis Bag
 - Semi-permeable membrane
 - Water, glucose, & starch
- What passes through the dialysis bag?
 - Glucose (Benedict's Test)
 - Starch (Iodine Solution)
- Time Course Experiment
 - Every 10 minutes, measure the amount of glucose & starch present in the beaker



Effect of Water on Cells

- Hypertonic Environment
 - High [solute], low [water]



- Hypotonic Environment
 - High [water], low [solute]

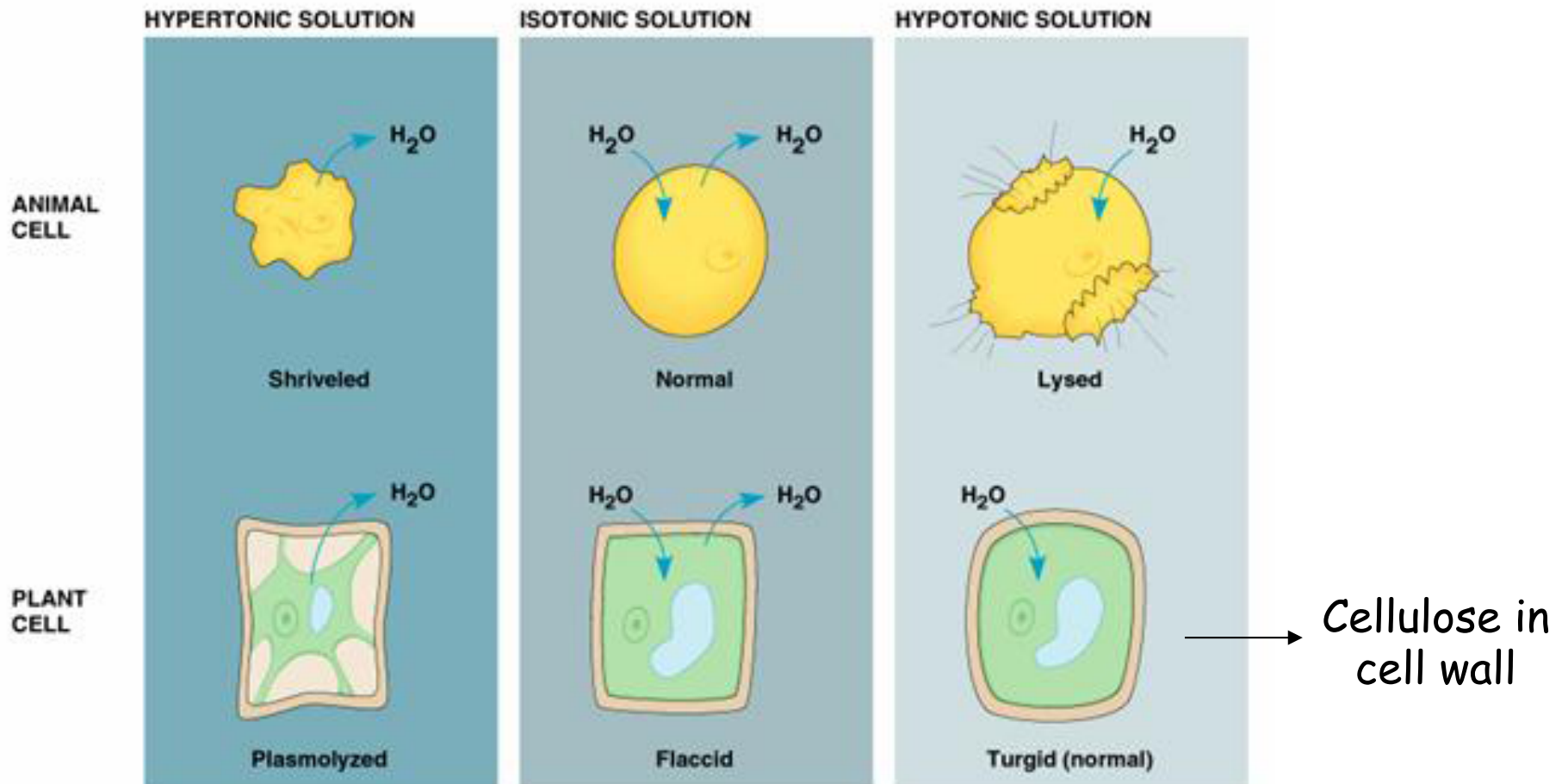
- Isotonic Environment
 - [water] = [solute]

Hypertonic

Hypotonic

Isotonic

Osmosis in Living Cells



Transportation of Molecules

- Passive Transport

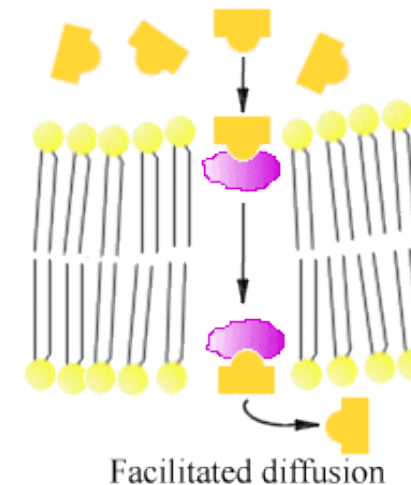
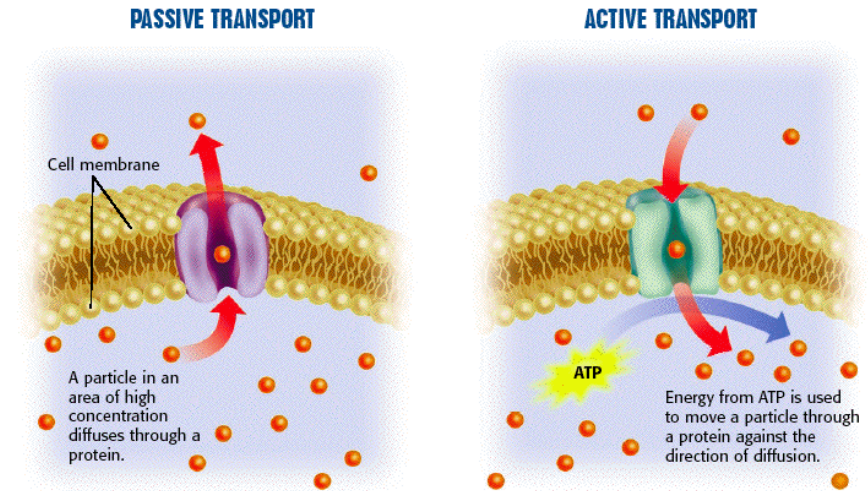
- Movement of molecules across a semi-permeable membrane
- no energy required

- Active Transport

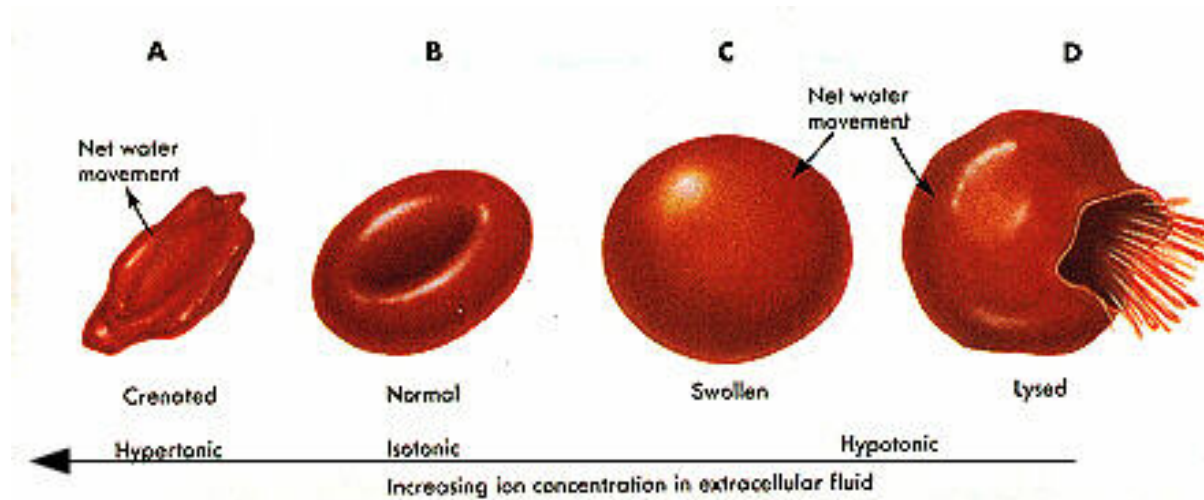
- Movement of molecules across a semi-permeable membrane against a concentration gradient with a protein
- ENERGY - ATP

- Facilitated Diffusion

- Movement of molecules across a semi-permeable membrane with a protein
- no energy required

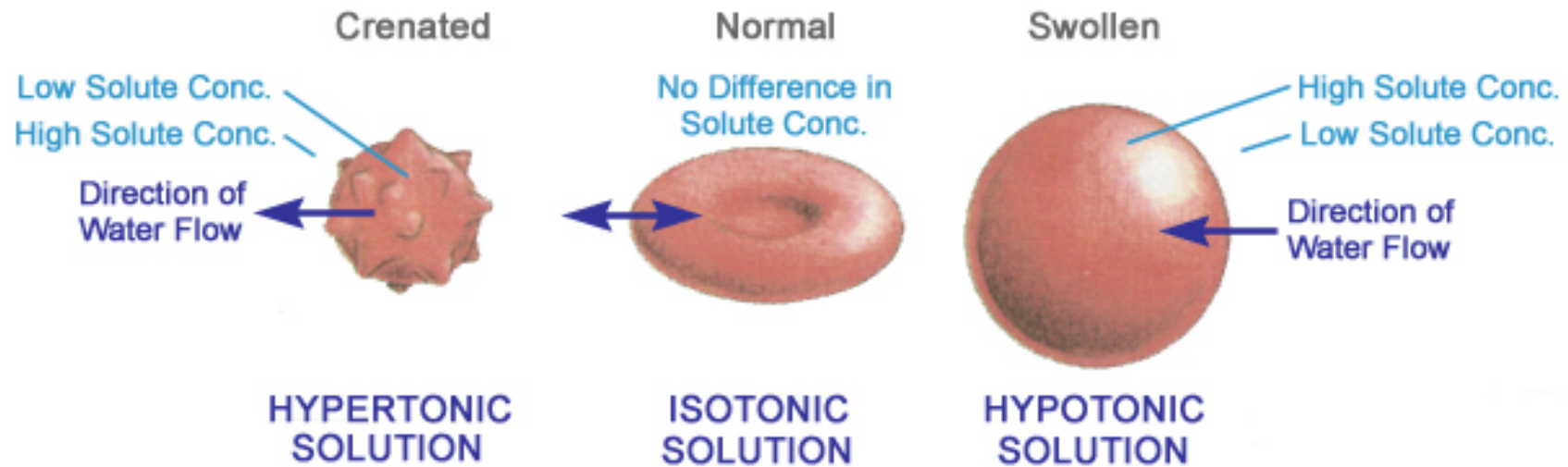


Effect of Water on RBC



From: Alters, S. Biology:
Understanding Life. Copyright
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Tonicity Effects on the Red Blood Cell



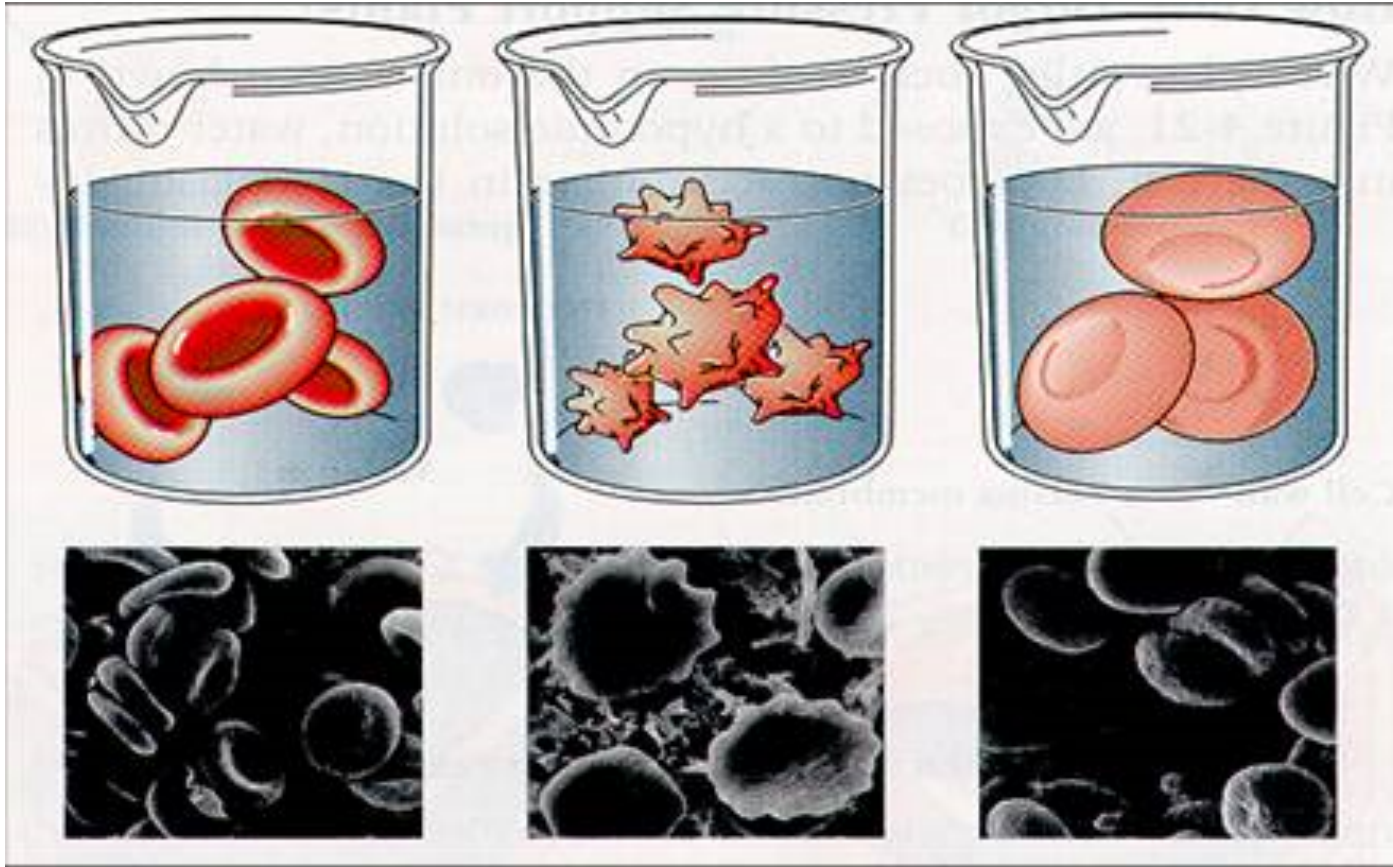
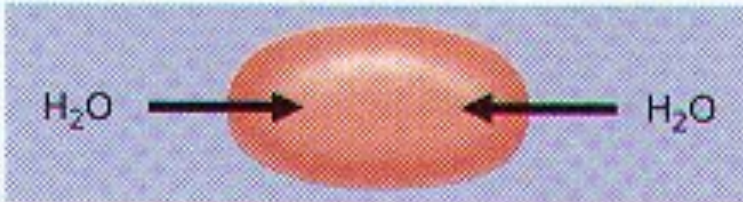
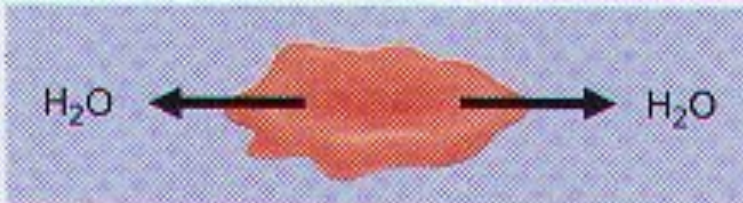


TABLE 5-1 *Direction of Osmosis*

Condition	Net movement of water	
External solution is hypotonic to cytosol	into the cell	
External solution is hypertonic to cytosol	out of the cell	
External solution is isotonic to cytosol	none	